

AMSER Rad Path Case of the Month:

Urothelial Carcinoma

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Patient Presentation

HPI:

An 84-year-old woman with a history of left partial colectomy for adenocarcinoma presented for recurrent UTIs, gross hematuria, and was found to have worsening creatinine levels. CT scan showed an enhancing mass in the distal right ureter with associated severe hydronephrosis of the right kidney. Further evaluation with cystoscopy and ureteroscopy with biopsy was recommended. She denied other urological problems including flank pain, suprapubic pain, and fever.

Pertinent social history

Previous smoker (0.5 packs per day for unknown number of years)

Pertinent Labs

- Hgb: 10.8 (low)
- Hct: 34 (low)
- BUN: 28 (high)
- Creatinine: 1.44 (high, baseline of 0.9)
- UA: 2+ blood, RBCs too numerous to count

ACR Appropriateness Criteria

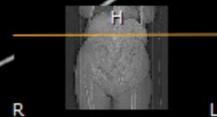
Variant 4: Gross hematuria. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
CTU without and with IV contrast	Usually Appropriate	☼☼☼☼☼
MRU without and with IV contrast	Usually Appropriate	○
CT abdomen and pelvis without and with IV contrast	May Be Appropriate	☼☼☼☼☼
MRI abdomen and pelvis without and with IV contrast	May Be Appropriate	○
MRI abdomen and pelvis without IV contrast	May Be Appropriate	○
US kidneys and bladder retroperitoneal	May Be Appropriate	○
CT abdomen and pelvis with IV contrast	May Be Appropriate	☼☼☼
CT abdomen and pelvis without IV contrast	May Be Appropriate	☼☼☼
Radiography abdomen and pelvis (KUB)	Usually Not Appropriate	☼☼
Arteriography kidney	Usually Not Appropriate	☼☼☼
Radiography intravenous urography	Usually Not Appropriate	☼☼☼

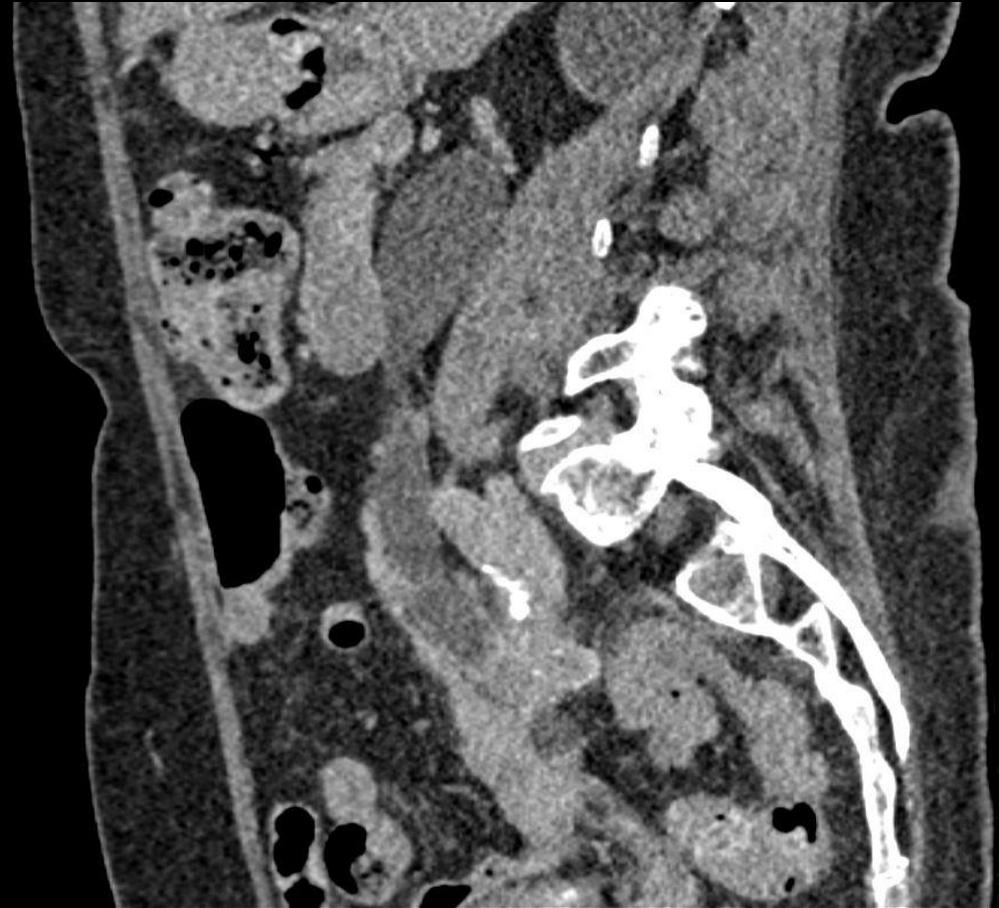
This imaging modality was ordered



Radiology Images (not labeled)



Radiology Images (not labeled)



Radiology Images (labeled)

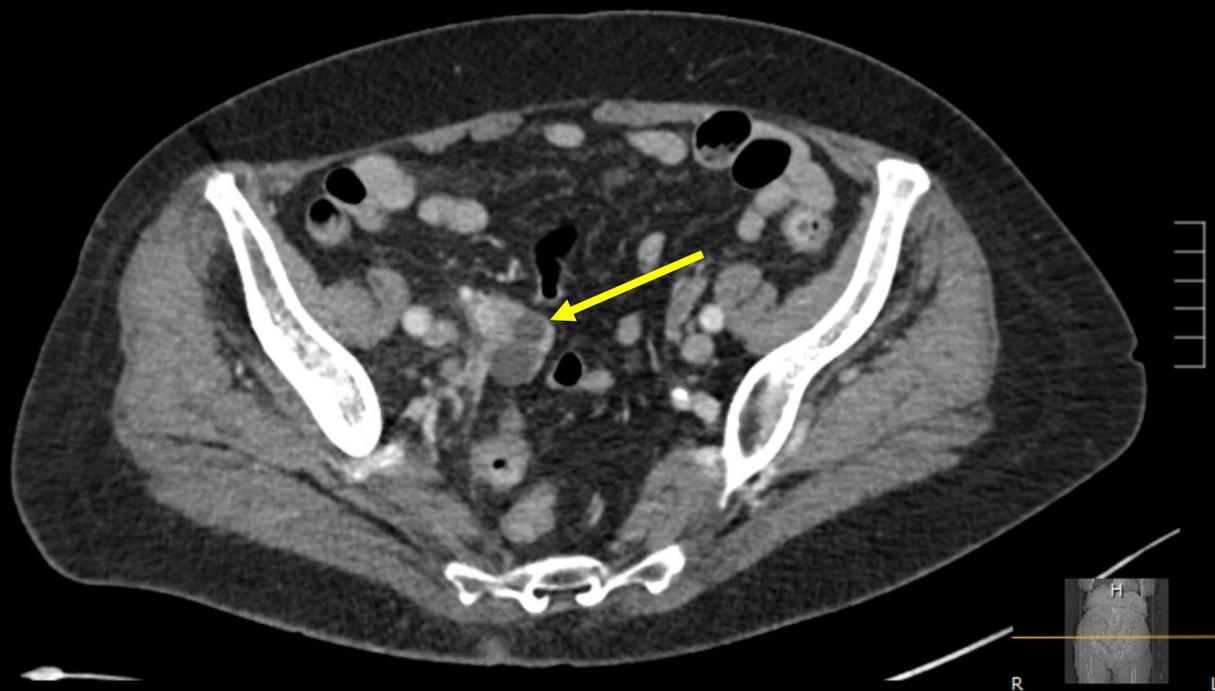


Hydronephrosis of right kidney, shown by the green arrow.

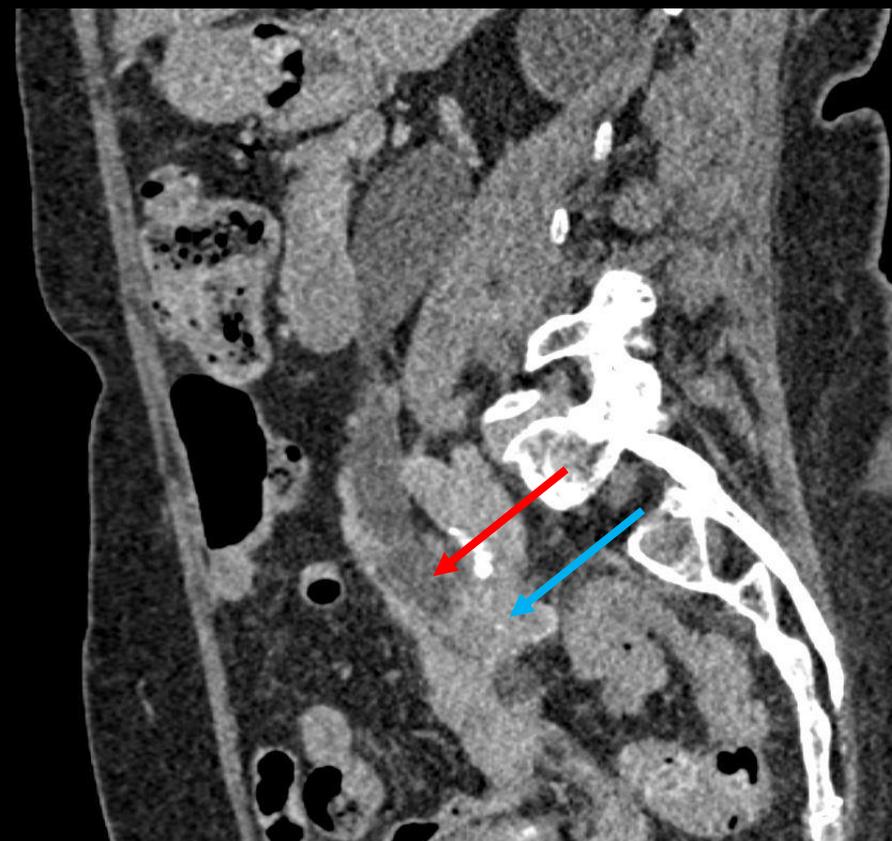


Left kidney in pyelographic phase, excreting contrast normally, indicated by yellow arrow. Right kidney not excreting contrast and has dilated collecting system, indicated by red arrow.

Radiology Images (labeled)



Ureteral Mass in the distal right ureter, shown by the yellow arrow.



Sagittal reformatted image showing dilated left ureter to level of filling defect, indicated by the red arrow. Mass is indicated by the blue arrow.

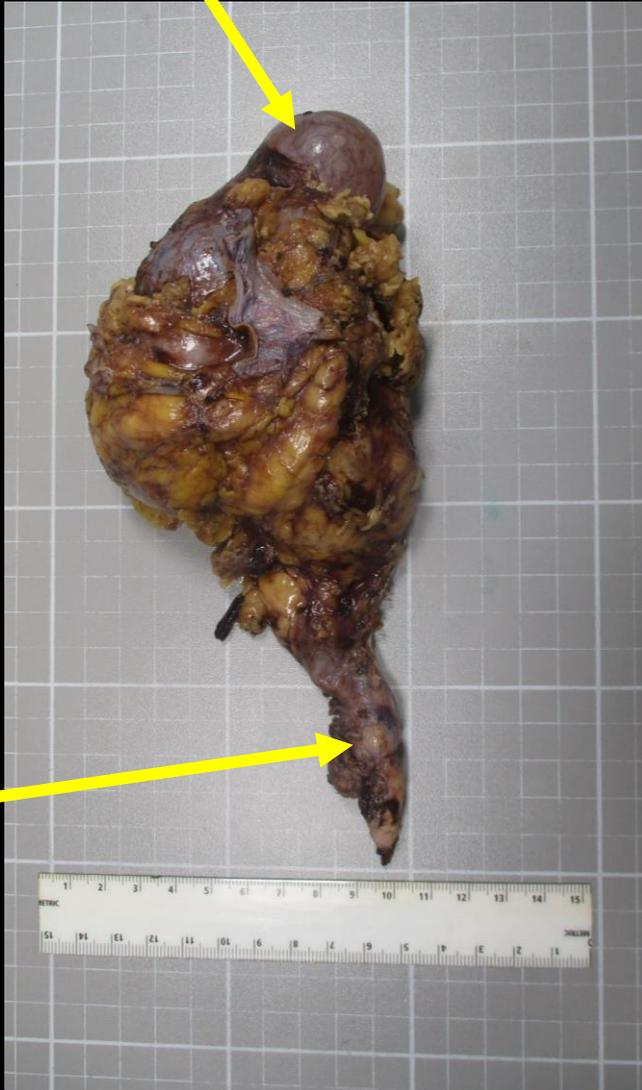
DDX (based on imaging)

- Ureteral Mass:
 - Urothelial carcinoma
 - Squamous cell carcinoma of ureter
 - Adenocarcinoma of ureter
 - Metastatic disease
 - Fibroepithelial polyp

*Thank you to Michelle Richard for helping to prepare the gross images

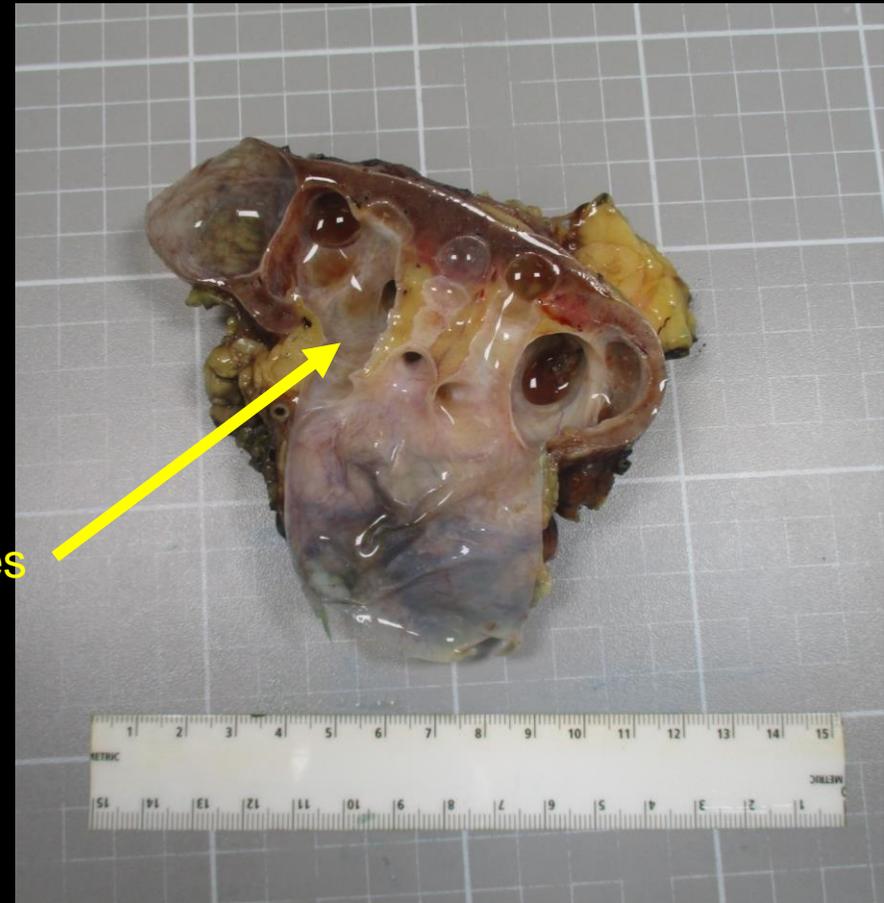
Gross Path (labeled)

Cyst on Kidney



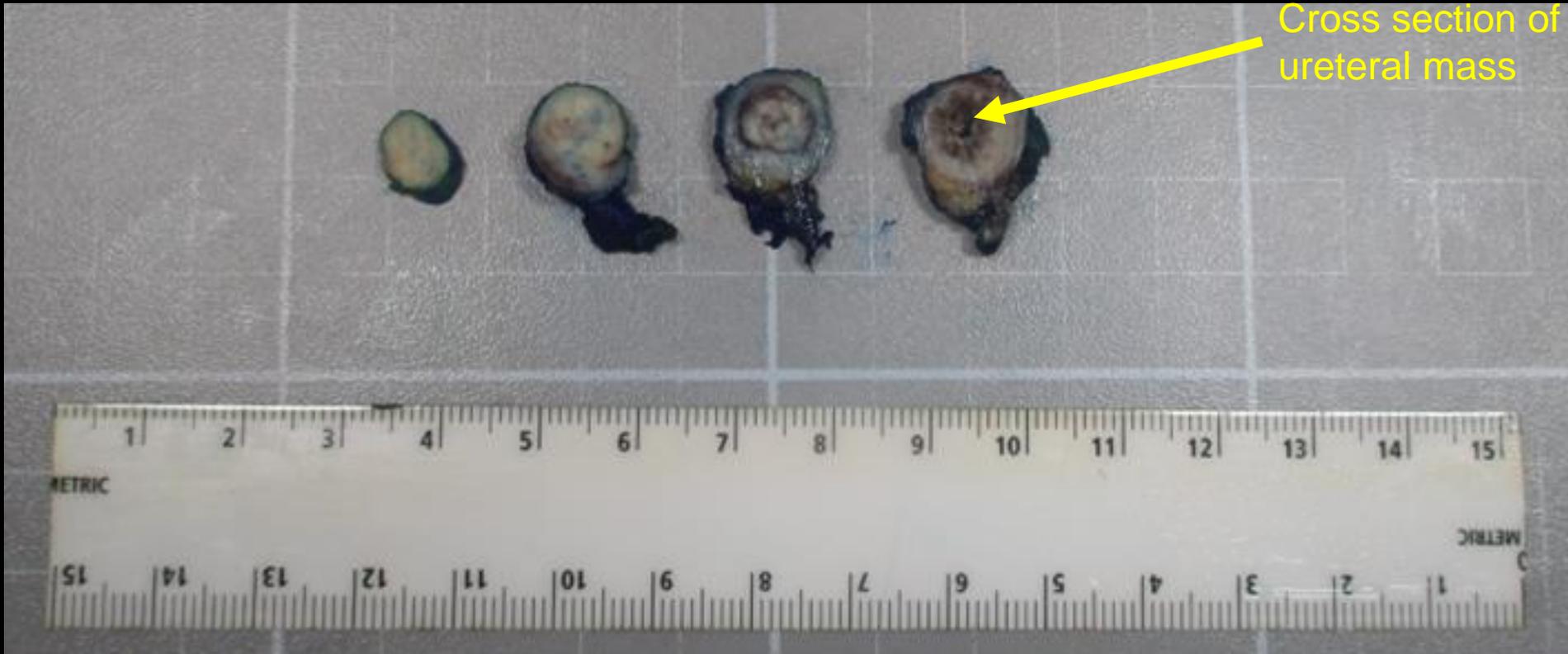
Ureteral mass

Dilated calyces

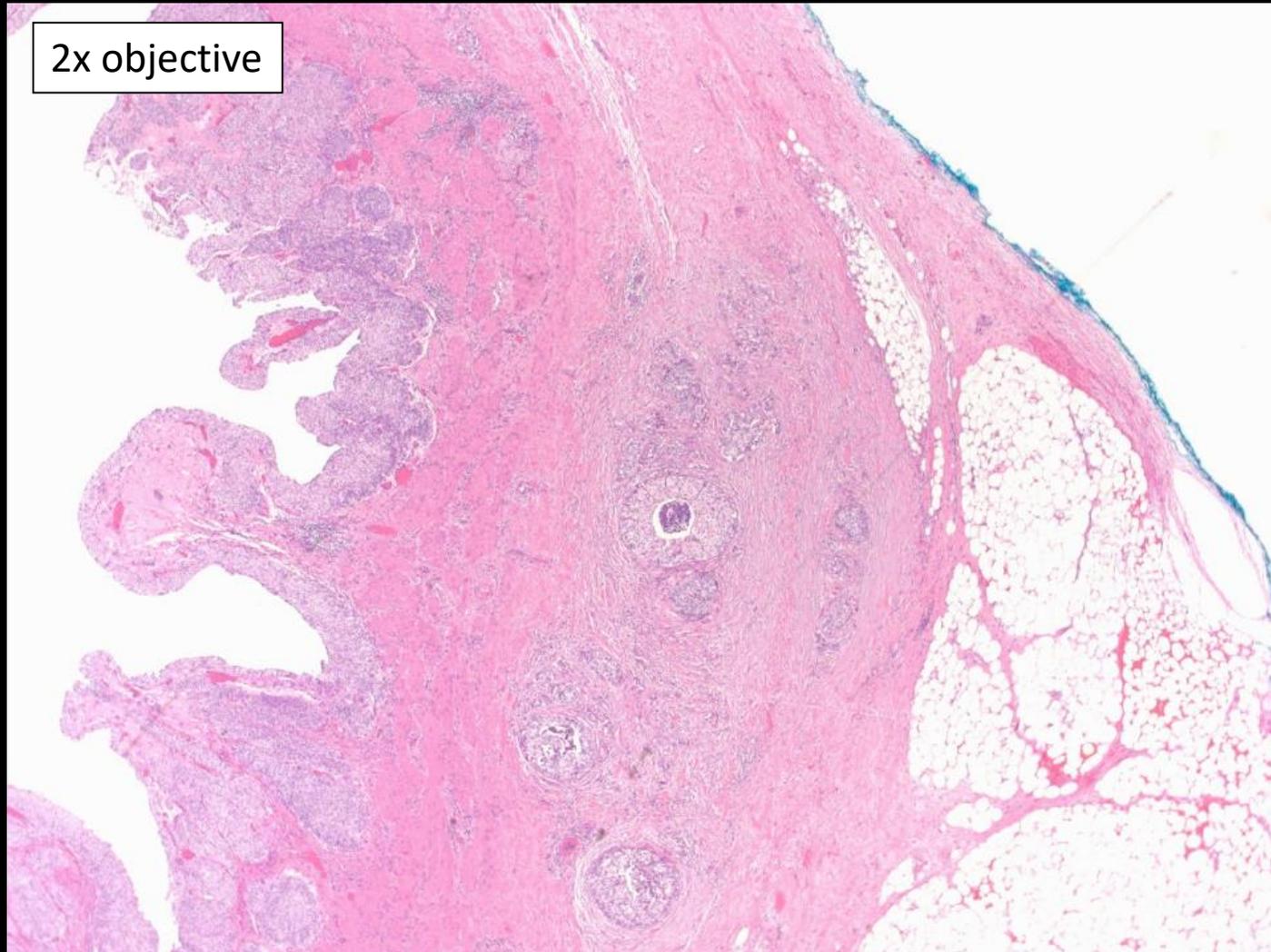


Cross section of kidney showing hydronephrosis

Gross Path (labeled)

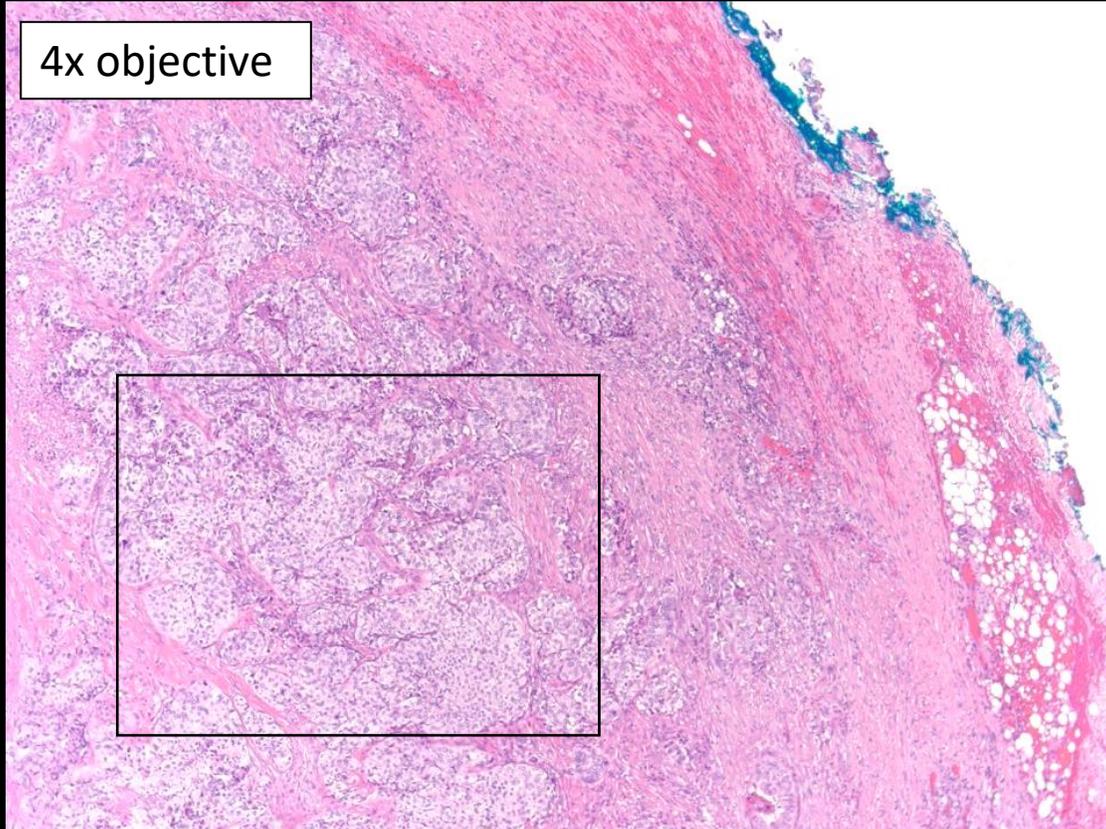


Micro Path (labeled)

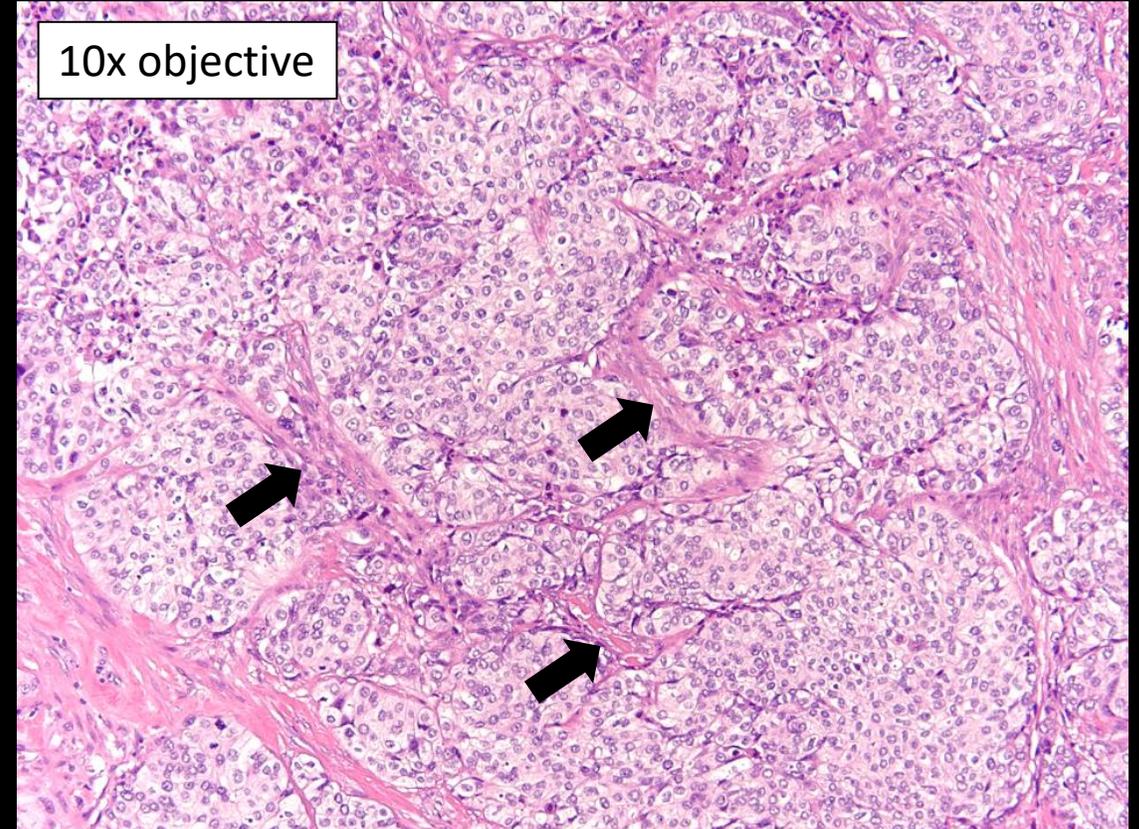


Full-thickness section showing invasive urothelial carcinoma involving ureteral wall.

Micro Path (labeled)



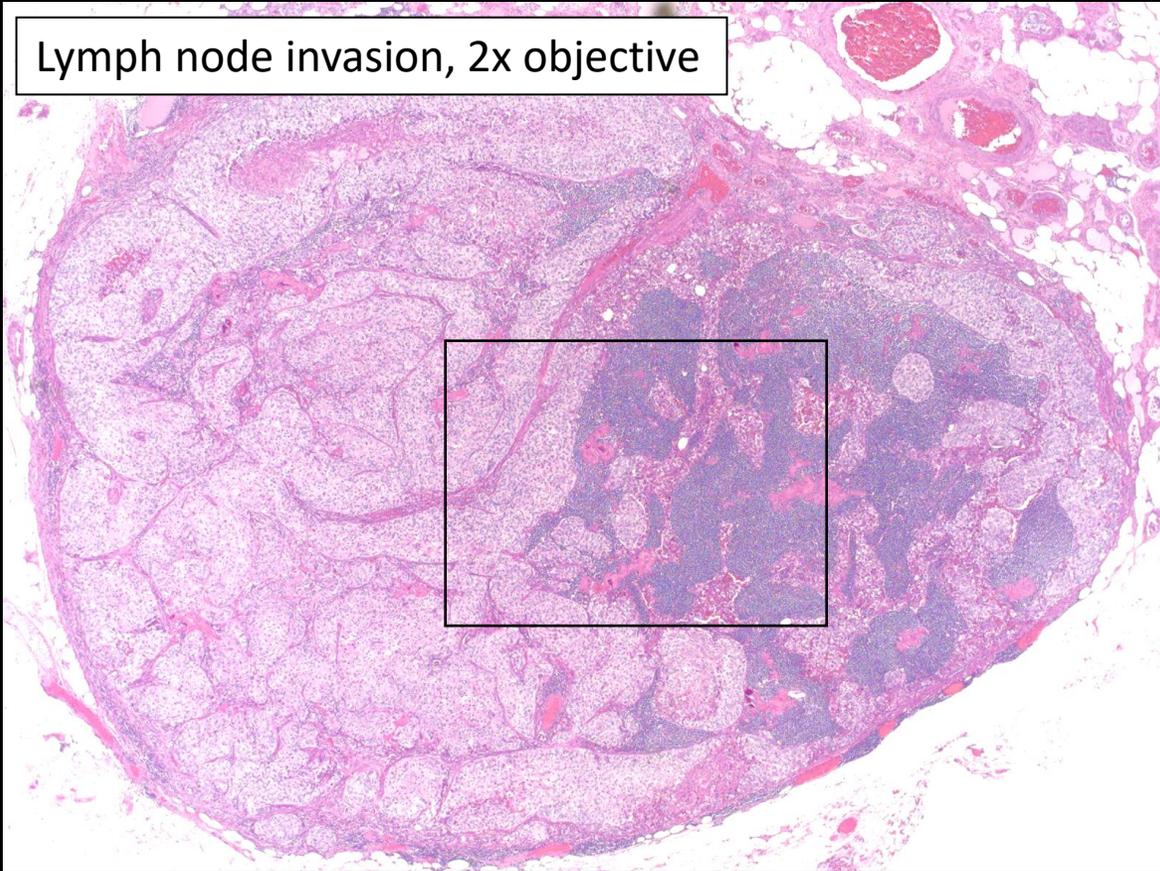
Invasive urothelial carcinoma involving ureteral wall (muscularis propria and serosa), shown by the black box.



The invasive tumor shows solid irregular nested architecture, composed of cells with pale eosinophilic cytoplasm and vesicular pleomorphic nuclei. The fibrovascular cores are indicated with the black arrows.

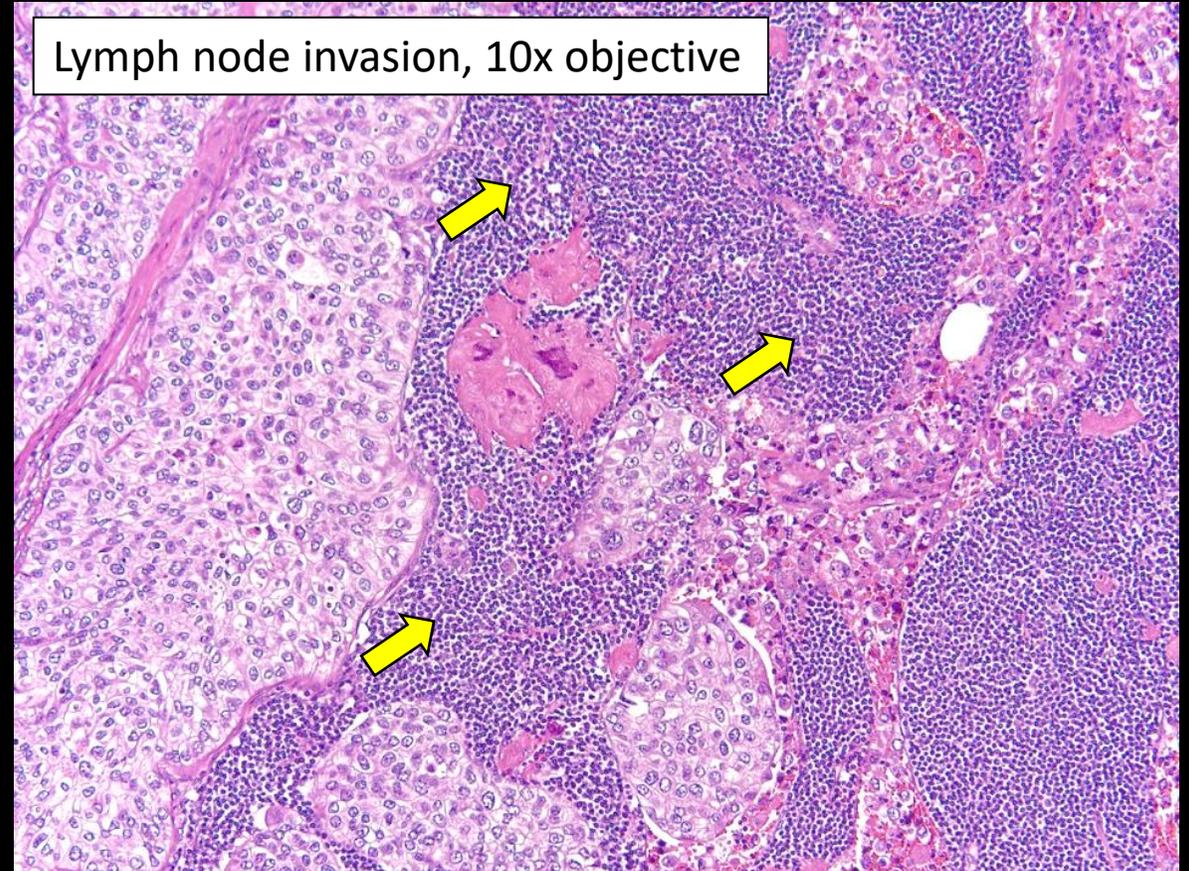
Micro Path (labeled)

Lymph node invasion, 2x objective



Metastasis to lymph node, indicated by black box.

Lymph node invasion, 10x objective



Higher power of metastasis to lymph nodes. The normal lymphoid tissue is indicated by the yellow arrows.

Final Dx:

Invasive Papillary Urothelial Carcinoma, pT3 N2

Case Discussion

- Upper tract urothelial carcinoma is a rare subset of urothelial cancers (10-15% of urothelial cancers)
 - Urothelial cancer most often affects bladder
 - More common in men than women (3:1)
 - 90% of urothelial carcinomas are transitional cell carcinomas
 - Risk factors include smoking, occupational exposures, and phenacetine
 - Rare cases linked to HNPCC (lynch syndrome – colorectal and endometrial tumors)
 - HNPCC associated with a 22-fold increased relative risk of developing urothelial carcinoma of the ureter

Case Discussion

- Urothelial neoplasms are divided into papillary and non-papillary
 - Papillary are exophytic with papillae containing well-defined fibrovascular cores
 - Urothelium carcinoma in situ is characterized by extensive replacement of the urothelium by cytological atypia but no invasion in the bladder wall
 - Invasive urothelial carcinoma invades the bladder wall
 - The neoplastic cells in invasive urothelial carcinoma are large with eosinophilic cytoplasm and nuclear atypia
 - Characteristic features of urothelial carcinoma include the presence of longitudinal nuclear grooves typically seen in low-grade tumors

Case Discussion

- Clinical presentation:
 - Hematuria present at diagnosis in 70-80% of cases
 - Obstruction of the ureter or ureteropelvic junction can cause flank pain
 - Bladder irritation occur in less than 10% of cases
- Diagnosis:
 - Radiological imaging and ureteroscopy are the initial diagnostic tools
 - Seen on urography as filling defects or focal mural thickening
 - Patients must be carefully evaluated for multiple tumors since urothelial tumors can exhibit drop metastasis
 - The most common site of metastasis is regional lymph nodes

Case Discussion

- Treatment:
 - Surgery is the only potentially curative treatment
 - Nephroureterectomy is the gold standard for most patients
 - In situ disease can be managed with instillation of BCG, but only in patients in whom definitive therapy is not feasible
 - For patients with high-risk disease (pT2 or greater), adjuvant chemotherapy with gemcitabine plus cisplatin is used
 - The prognosis is related to the clinical stage and presence/absence of lymph node involvement
 - Average 5-year cancer-specific survival rate is 73%

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